

MLLNVLRICI	IVCLVNDGAG	KHSEGRERTK	TYSLNSRGYF	40
RKERGARRSK	ILLVNTKGLD	EPHIGHGDFG	LVAELFDSTR	80
THTNRKEPDM	NKVKLFSTVA	HG <u>NKS</u> ARRKA	Y <u>NGS</u> RRNIFS	120
RRSFDKRNTE	VTEKPGAKMF	WNNFLVKMNG	AP <u>QNT</u> SHGSK	160
AQEIMKEACK	TLPFTQNIVH	ENC DR MVIQN	NLCFGKCISL	200
HVPNQD RR N	TC SH CLPSKF	TLNHLTL <u>NCT</u>	GSKNVVKVVM	240
MVEECTCEAH	KSNFHQTAQF	NMDTSTTLHH		270

Figure 1. Deduced amino acid sequence of *Xenopus cerberus* protein. SEQ ID NO:1.

Figure 2. Nucleotide sequence of the full-length cerberus DNA derived from the *Xenopus* organizer. The sense strand is on top (in the 5' to 3' direction) and the antisense strand on the bottom line (on the opposite direction). SEQ ID NO:2.

GAATCCCAG	CAAGTCGCTC	AGAAACACTG	CAGGGTCTAG	ATATCATACA	ATGTTACTAA	60
CTTAAGGGTC	GTTCAGCGAG	TCTTTGTGAC	GTCCAGATC	TATAGTATGT	TACAATGATT	
ATGTTACTCAG	GATCTGTATT	ATCGTCTGCC	TTGTGAATGA	TGGAGCAGGA	AAACACTCAG	120
TACATGAGTC	CTAGACATAA	TAGCAGACGG	AACACTTACT	ACCTCGTCCT	TTTGTGAGTC	
AAGGACGAGA	AAGGACAAAA	ACATATTTCAC	TTAACAGCAG	AGGTTACTTC	AGAAAAGAAA	180
TTCTGCTCT	TTCTGTTTT	TGTATAAGTG	AATTGTCGTC	TCCAATGAAG	TCTTTTCTTT	
GAGGAGCACG	TAGGAGCAAG	ATTCTGCTGG	TGAATACTAA	AGGTCTTGAT	GAACCCACA	240
CTCCTCGTGC	ATCCTCGTTC	TAAGACGACC	ACTTATGATT	TCCAGAACTA	CTTGGGGTGT	
TTGGGCATGG	TGATTTTCGC	TTAGTAGCTG	AACTATTTGA	TTCCACCAGA	ACACATACAA	300
AACCCGTACC	ACTAAAAGCG	AATCATCGAC	TTGATAAACT	AAGGTGGTCT	TGTGTATGTT	
ACAGAAAAGA	GCCAGACATG	AACAAAGTCA	AGCTTTTCTC	AACAGTTGCC	CATGGAAACA	360
TGCTTTTTCT	CGGTCTGTAC	TTGTTTCAGT	TCGAAAAGAG	TTGTCAACGG	GTACCTTTGT	
AAAGTGCAAG	AAGAAAAGCT	TACAATGGTT	CTAGAAGGAA	TATTTTTCCT	CGCCGTTCTT	420
TTTCACGTTT	TTCTTTTCGA	ATGTTACCAA	GATCTTCCTT	ATAAAAAGGA	GCGGCAAGAA	
TTGATAAAAG	AAATACAGAG	GTTACTGAAA	AGCCTGGTGC	CAAGATGTTT	TGGAACAATT	480
AACTATTTTC	TTTATGTCTC	CAATGACTTT	TCGGACCACG	GTTCTACAAG	ACCTTGTTAA	
TTTTGGTTAA	AATGAATGGA	GCCCCACAGA	ATACAAGCCA	TGGCAGTAAA	GCACAGGAAA	540
AAAACCAATT	TTACTTACCT	CGGGGTGTCT	TATGTTCCGT	ACCGTCATTT	CGTGTCTTT	
TAATGAAAGA	AGCTTGCAAA	ACCTTGTTTT	TCACTCAGAA	TATTGTACAT	GAAAACTGTG	600
ATTACTTTCT	TCGAACGTTT	TGGAACAAAA	AGTGAGTCTT	ATAACATGTA	CTTTTGACAC	
ACAGGATGGT	GATACAGAAC	AATCTGTGCT	TTGGTAAATG	CATCTCTCTC	CATGTTCCAA	660
TGTCCTACCA	CTATGTCTTG	TTAGACACGA	AACCATTTAC	GTAGAGAGAG	GTACAAGGTT	
ATCAGCAAGA	TCGACGAAAT	ACTTGTTCCC	ATTGCTTGCC	GTCCAAATTT	ACCCTGAACC	720
TAGTCGTTCT	AGCTGCTTTA	TGAACAAGGG	TAACGAACGG	CAGGTTTAAA	TGGGACTTGG	
ACCTGACGCT	GAATTGTACT	GGATCTAAGA	ATGTAGTAAA	GGTTGTCATG	ATGGTAGAGG	780
TGGACTGCGA	CTTAACATGA	CCTAGATTCT	TACATCATTT	CCAACAGTAC	TACCATCTCC	
AATGCACGTG	TGAAGCTCAT	AAGAGCAACT	TCCACCAAAC	TGCACAGTTT	AACATGGATA	840
TTACGTGCAC	ACTTCGAGTA	TTCTCGTTGA	AGGTGGTTTG	ACGTGTCAAA	TTGTACCTAT	
CATCTACTAC	CCTGCACCAT	TAAAGGACTG	CCATACAGTA	TGGAAATGCC	CTTTTGTGG	900
GTAGATGATG	GGACGTGGTA	ATTTCTGAC	GGTATGTCAT	ACCTTTACGG	GAAAAACAACC	
AATATTTGTT	ACATACTATG	CATCTAAAGC	ATTATGTTGC	CTTCTATTTT	ATATAACCAC	960
TTATAAACAA	TGTATGATAC	GTAGATTTCG	TAATACAACG	GAAGATAAAG	TATATTGGTG	
ATGGAATAAG	GATTGTATGA	ATTATAATTA	ACAAATGGCA	TTTTGTGTAA	CATGCAAGAT	1020
TACCTTATTC	CTAACATACT	TAATATTAAT	TGTTTACCGT	AAACACATT	GTACGTTCTA	

CTCTGTTCCA	TCAGTTGCAA	GATAAAAGGC	AATATTTGTT	TGACTTTTTT	TCTACAAAAT	1080
GAGACAAGGT	AGTCAACGTT	CTATTTTCCG	TTATAAACAA	ACTGAAAAAA	AGATGTTTTA	
GAATACCCAA	ATATATGATA	AGATAATGGG	GTCAAAACTG	TTAAGGGGTA	ATGTAATAAT	1140
CTTATGGGTT	TATATACTAT	TCTATTACCC	CAGTTTTGAC	AATTCCCAT	TACATTATTA	
AGGGACTAAG	TTTGCCCAAG	AGCAGTGACC	CATAACAACC	AATCAGCAGG	TATGATTTAC	1200
TCCCTGATTC	AAACGGGTCC	TCGTCACTGG	GTATTGTTGG	TTAGTCGTCC	ATACTAAATG	
TGGTCACCTG	TTTAAAAGCA	AACATCTTAT	TGGTTGCTAT	GGGTTACTGC	TTCTGGGCAA	1260
ACCAGTGGAC	AAATTTTCGT	TTGTAGAATA	ACCAACGATA	CCCAATGACG	AAGACCCGTT	
AATGTGTGCC	TCATAGGGGG	GTTAGTGTGT	TGTGTACTGA	ATAAATTGTA	TTTATTTTCAT	1320
TTACACACGG	AGTATCCCCC	CAATCACACA	ACACATGACT	TATTTAACAT	AAATAAAGTA	
TGTTACAAAA	AAAAAAA					
ACAATGTTTT	TTTTTTTT					

Fig. 2. (Continuation page 2, SEQ ID NO:2).

MSRTRKVDSL LLLAIPGLAL LLLPNAYCAS CEPVRIPMCK SMPWNMTKMP NHLHHSTQAN 60
AILAIEQFEG LLTTECSQDL LFFLCAMYAP ICTIDFQHEP IKPCKSV CER ARAGCEPILI 120
KYRHTWPESL ACEELPVYDR GVCISPEAIV TVEQGTDSMP DFSMDSNNGN CGSGREHCKC 180
KPMKATQKTY LKNYNYVIR AKVKEVKVVC HDATAIVEVK EILKSSLVNI PKDVTLYTN 240
SGCLCPQLVA NEEYIIMGYE DKERTRLLLV EGS LAEKWRD RLAKKVKRWD QKLRRPRKSK 300
DPVAPIPNKN SNSRQARS

Figure 3. Deduced amino acid sequence of *Xenopus* frazzled protein. SEQ ID NO:3.

Figure 4. Nucleotide sequence of the full-length frazzled cDNA derived from the *Xenopus* organizer. The sense strand of the DNA on top (5' to 3' direction) and the antisense strand on the bottom line (opposite direction). SEQ ID NO:4.

GAATTCCCTT TCACACAGGA CTCCTGGCAG AGGTGAATGG TTAGCCCTAT GGATTTGGTT	60
CTTAAGGGAA AGTGTGTCTT GAGGACCGTC TCCACTTACC AATCGGGATA CCTAAACCAA	
TGTTGATTTT GACACATGAT TGATTGCTTT CAGATAGGAT TGAAGGACTT GGATTTTAT	120
ACAACTAAAA CTGTGTACTA ACTAACGAAA GTCTATCCTA ACTTCCTGAA CCTAAAAATA	
CTAATTCTGC ACTTTTAAAT TATCTGAGTA ATTGTTTATT TTGTATTGGA TGGGACTAAA	180
GATTAAGACG TGAAAAATTTA ATAGACTCAT TAACAAGTAA AACATAACCT ACCCTGATTT	
GATAAACTTA ACTCCTTGCT TTTGACTTGC CCATAAACTA TAAGGTGGGG TGAGTTGTAG	240
CTATTTGAAT TGAGGAACGA AAAGTGAACG GGTATTTGAT ATTCCACCCC ACTCAACATC	
TTGCTTTTAC ATGTGCCAG ATTTTCCCTG TATTCCCTGT ATTCCCTCTA AAGTAAGCCT	300
AACGAAAATG TACACGGGTC TAAAAGGGAC ATAAGGGACA TAAGGGAGAT TTCATTCGGA	
ACACATACAG GTTGGGCAGA ATAACAATGT CTCGAACAAG GAAAGTGGAC TCATTACTGC	360
TGTGTATGTC CAACCCGTCT TATTGTTACA GAGCTTGTTT CTTTCACCTG AGTAATGACG	
TACTGGCCAT ACCTGGACTG GCGCTTCTCT TATTACCCAA TGCTTACTGT GCTTCGTGTG	420
ATGACCGGTA TGGACCTGAC CGCGAAGAGA ATAATGGGTT ACGAATGACA CGAAGCACAC	
AGCCTGTGCG GATCCCCATG TGCAAATCTA TGCCATGGAA CATGACCAAG ATGCCCAACC	480
TCGGACACGC CTAGGGGTAC ACGTTTAGAT ACGGTACCTT GTACTGGTTC TACGGGTTGG	
ATCTCCACCA CAGCACTCAA GCCAATGCCA TCCTGGCAAT TGAACAGTTT GAAGGTTTGC	540
TAGAGGTGGT GTCGTGAGTT CGGTTACGGT AGGACCGTTA ACTTGTCAA CTTCCAAACG	
TGACCACTGA ATGTAGCCAG GACCTTTTGT TCTTTCTGTG TGCCATGTAT GCCCCATTT	600
ACTGGTGACT TACATCGGTC CTGGAAAACA AGAAAGACAC ACGGTACATA CGGGGGTAAA	
GTACCATCGA TTTCCAGCAT GAACCAATTA AGCCTTGCAA GTCCGTGTGC GAAAGGGCCA	660
CATGGTAGCT AAAGTTCGTA CTTGGTTAAT TCGGAACGTT CAGGCACACG CTTTCCGGT	
GGGCCGGCTG TGAGCCCATC CTCATAAAGT ACCGGCACAC TTGGCCAGAG AGCCTGGCAT	720
CCCGGCCGAC ACTCGGGTAA GAGTATTTCA TGGCCGTGTG AACCAGTCTC TCGGACCGTA	
GTGAAGAGCT GCGCGTATAT GACAGAGGAG TCTGCATCTC CCCAGAGGCT ATCGTCACAG	780
CACCTTCTCGA CGGGCATATA CTGTCTCCTC AGACGTAGAG GGGTCTCCGA TAGCAGTGTC	
TGGAACAAGG AACAGATTCA ATGCCAGACT TCTCCATGGA TTCAAACAAT GGAAATTGCG	840
ACCTTGTTC TGTCTAAGT TACGGTCTGA AGAGGTACCT AAGTTTGTTA CCTTTAACGC	
GAAGCGGCAG GGAGCACTGT AAATGCAAGC CCATGAAGGC AACCCTAAAG ACGTATCTCA	900
CTTCGCCGTC CCTCGTGACA TTTACGTTCC GGTACTTCCG TTGGGTTTTT TGCATAGAGT	
AGAATAATTA CAATTATGTA ATCAGAGCAA AAGTGAAAGA GGTGAAAGTG AAATGCCACG	960
TCTTATTAAT GTTAATACAT TAGTCTCGTT TTCACTTTCT CCACTTTCAC TTTACGGTGC	
ACGCAACAGC AATTGTGGAA GTAAAGGAGA TTCTCAAGTC TTCCCTAGTG AACATTCCCTA	1020
TGCGTTGTCT TTAACACCTT CATTTCTCTT AAGAGTTCAG AAGGGATCAC TTGTAAGGAT	

AAGACACAGT	GACACTGTAC	ACCAACTCAG	GCTGCTTGTG	CCCCCAGCTT	GTTGCCAATG	1080
TTCTGTGTCA	CTGTGACATG	TGGTTGAGTC	CGACGAACAC	GGGGGTCGAA	CAACGGTTAC	
AGGAATACAT	AATTATGGGC	TATGAAGACA	AAGAGCGTAC	CAGGCTTCTA	CTAGTGGAAG	1140
TCCTTATGTA	TTAATACCCG	ATACTTCTGT	TTCTCGCATG	GTCCGAAGAT	GATCACCTTC	
GATCCTTGGC	CGAAAAATGG	AGAGATCGTC	TTGCTAAGAA	AGTCAAGCGC	TGGGATCAAA	1200
CTAGGAACCG	GCTTTTACC	TCTCTAGCAG	AACGATTCTT	TCAGTTCGCG	ACCCTAGTTT	
AGCTTCGACG	TCCCAGGAAA	AGCAAAGACC	CCGTGGCTCC	AATTCCCAAC	AAAAACAGCA	1260
TCGAAGCTGC	AGGGTCCTTT	TCGTTTCTGG	GGCACCGAGG	TTAAGGGTTG	TTTTTGTCGT	
ATTCCAGACA	AGCGCGTAGT	TAGACTAACG	GAAAGGTGTA	TGGAACTCT	ATGGACTTTG	1320
TAAGGTCTGT	TCGCGCATCA	ATCTGATTGC	CTTCCACAT	ACCTTTGAGA	TACCTGAAAC	
AAACTAAGAT	TTGCATTGTT	GGAAGAGCAA	AAAAGAAATT	GCACTACAGC	ACGTTATATT	1380
TTTGATTCTA	AACGTAACAA	CCTTCTCGTT	TTTTCTTTAA	CGTGATGTCG	TGCAATATAA	
CTATTGTTTA	CTACAAGAAG	CTGGTTTAGT	TGATTGTAGT	TCTCCTTTCC	TTCTTTTTTT	1440
GATAACAAAT	GATGTTCTTC	GACCAAATCA	ACTAACATCA	AGAGGAAAGG	AAGAAAAAAA	
TTATAACTAT	ATTTGCACGT	GTTCCAGGC	AATTGTTTAA	TTCAACTTCC	AGTGACAGAG	1500
AATATTGATA	TAAACGTGCA	CAAGGGTCCG	TTAACAAAAT	AAGTTGAAGG	TCAGTGTCTC	
CAGTGACTGA	ATGTCTCAGC	CTAAGAAGC	TCAATTCATT	TCTGATCAAC	TAATGGTGAC	1560
GTCAGTACT	TACAGAGTCG	GATTTCTTCG	AGTTAAGTAA	AGACTAGTTG	ATTACCACTG	
AAGTGTGTTGA	TACTTGGGGA	AAGTGAACCT	ATTGCAATGG	TAAATCAGAG	AAAAGTTGAC	1620
TTACAAACT	ATGAACCCCT	TTCATTGAT	TAACGTTACC	ATTTAGTCTC	TTTTCAACTG	
CAATGTTGCT	TTTCTGTAG	ATGAACAAGT	GAGAGATCAC	ATTTAAATGA	TGATCACTTT	1680
GTTACAACGA	AAAGGACATC	TACTTGTTCA	CTCTCTAGTG	TAAATTTACT	ACTAGTGAAA	
CCATTTAATA	CTTTCAGCAG	TTTTAGTTAG	ATGACATGTA	GGATGCACCT	AAATCTAAAT	1740
GGTAAATTAT	GAAAGTCGTC	AAAATCAATC	TACTGTACAT	CCTACGTGGA	TTTAGATTTA	
ATTTTATCAT	AAATGAAGAG	CTGGTTTAGA	CTGTATGGTC	ACTGTTGGGA	AGGTAAATGC	1800
TAAAATAGTA	TTTACTTCTC	GACCAAATCT	GACATACCAG	TGACAACCCCT	TCCATTTACG	
CTACTTTGTC	AATTCTGTTT	TAAAAATTGC	CTAAATAAAT	ATTAAGTCCT	AAATAAAAAA	1860
GATGAAACAG	TTAAGACAAA	ATTTTAAACG	GATTTATTTA	TAATTCAGGA	TTTATTTTTT	
AAAAAAAAAA	AAAAA					
TTTTTTTTTT	TTTTT					

Fig. 4. (Continuation page 2, SEQ ID NO:4).

MLLLFRAIPM LLLGLMVLQT DCEIAQYYID EEEPPGTVIA VLSQHSIFNT TDIPATNFRL	60
MKQFNNSLIG VRES DGQLSI MERIDREQIC RQSLHCNLAL DVVSFSKGHF KLLNVKVEVR	120
DINDHSPHFP SEIMHVEVSE SSSVGTRIPL EIAIDEDVGS NSIQNFQISN NSHFSIDVLT	180
RADGVKYADL VLMRELDREI QPTYIMELLA MDGGVPSLSG TAVVNIRVLD FNDNSPVFER	240
STIAVDLVED APLGYLLEL HATDDDEGVN GEIVYGSTL ASQEVRLFK INSRTGSVTL	300
EGQVDFETKQ TYEFEVQAQD LGPNPLTATC KVTVHILDVN DNTPAITITP LTTVNAGVAY	360
IPETATKENF IALISTTDRA SGSNGQVRCT LYGHEHFKLQ QAYEDSYMIV TTSTLDRENI	420
AAYSLTVVAE DLGFPSLGTK KYITVKVSDE NDNAPVFSKP QYEASILENN APGSYITTVI	480
ARDSDSQNG KVNRLVDAK VMGQSLTTFV SLDADSGVLR AVRSLDYEKL KQLDFEIEAA	540
DNGIPQLSTR VQLNLRIVDQ NDNCPVITNP LLNNGSGEVL LPISAPQNYL VFQLKAEDSD	600
EGHNSQLFYT ILRDPSRLFA INKESGEVFL KKQLNSDHSE DLSIVVAVYD LGRPSLSTNA	660
TVKFILTDSF PSNVEVVILQ PSAEEQHQID MSIIFIAVLA GGCALLLLAI FFVACTCKKK	720
AGEFKQVPEQ HGTCNEERLL STPSPQSVSS SLSQSESCQL SINTESENC S VSSNQEQHQQ	780
TGIKHSISVP SYHTSGWHL D NCAM SISGHS HMGHISTKVQ WAKEIVTSMT VTLILVENQK	840
RRALSSQCRH KPVLTQMNQ QGSDMPITIS ATESTRVQKM GTHACNMKRA IDCLTL	

Figure 5. Deduced amino acid sequence of the *Xenopus* PAPC (paraxial protocadherin) protein. It encodes a member of the cadherin family of transmembrane proteins that has dorsalizing activity when constructs are injected into *Xenopus* embryos. SEQ ID NO:5.

Figure 6. Nucleotide sequence of the full-length PAPC cDNA derived from the *Xenopus* organizer. The sense strand of the DNA is shown in the top line (in the 5' to 3' direction), and the bottom line shows the antisense strand (opposite orientation). SEQ ID NO:6.

GAATCCCAG	AGATGAACTC	CTTGAGATTG	TTTTAAATGA	CTGCAGGTCT	GGAAGGATTC	60
CTTAAGGGTC	TCTACTTGAG	GAACTCTAAC	AAAATTTACT	GACGTCCAGA	CCTTCCTAAG	
ACATTGCCAC	ACTGTTTCTA	GGCATGAAAA	AACTGCAAGT	TTCAACTTTG	TTTTTGGTGC	120
TGTAACGGTG	TGACAAAGAT	CCGTACTTTT	TTGACGTTCA	AAGTTGAAAC	AAAAACCACG	
AACTTTGATT	CTTCAAGATG	CTGCTTCTCT	TCAGAGCCAT	TCCAATGCTG	CTGTTGGGAC	180
TTGAAACTAA	GAAGTTCTAC	GACGAAGAGA	AGTCTCGGTA	AGGTTACGAC	GACAACCTG	
TGATGGTTTT	ACAAACAGAC	TGTGAAATTG	CCCAGTACTA	CATAGATGAA	GAAGAACCCC	240
ACTACCAAAA	TGTTTGCTG	ACACTTTAAC	GGGTCATGAT	GTATCTACTT	CTTCTTGGGG	
CTGGCACTGT	AATTGCAGTG	TTGTCACAAC	ACTCCATATT	TAACACTACA	GATATACCTG	300
GACCGTGACA	TTAACGTCAC	AACAGTGTTG	TGAGGTATAA	ATTGTGATGT	CTATATGGAC	
CAACCAATTT	CCGTCTAATG	AAGCAATTTA	ATAATTCCCT	TATCGGAGTC	CGTGAGAGTG	360
GTTGGTTAAA	GGCAGATTAC	TTCGTTAAAT	TATTAAGGGA	ATAGCCTCAG	GCACTCTCAC	
ATGGGCAGCT	GAGCATCATG	GAGAGGATTG	ACCGGGAGCA	AATCTGCAGG	CAGTCCCTTC	420
TACCGTGCGA	CTCGTAGTAC	CTCTCCTAAC	TGGCCCTCGT	TTAGACGTCC	GTCAGGGAAG	
ACTGCAACCT	GGCTTTGGAT	GTGGTCAGCT	TTTCCAAAGG	ACACTTCAAG	CTTCTGAACG	480
TGACGTTGGA	CCGAAACCTA	CACCAGTCGA	AAAGGTTTCC	TGTGAAGTTC	GAAGACTTGC	
TGAAAGTGGA	GGTGAGAGAC	ATTAATGACC	ATAGCCCTCA	CTTTCCAGT	GAAATAATGC	540
ACTTTCACCT	CCACTCTCTG	TAATTACTGG	TATCGGGAGT	GAAAGGGTCA	CTTTATTACG	
ATGTGGAGGT	GTCTGAAAGT	TCCTCTGTGG	GCACCAGGAT	TCCTTTAGAA	ATTGCAATAG	600
TACACCTCCA	CAGACTTTCA	AGGAGACACC	CGTGGTCCTA	AGGAAATCTT	TAACGTTATC	
ATGAAGATGT	TGGGTCCAAC	TCCATCCAGA	ACTTTCAGAT	CTCAAATAAT	AGCCACTTCA	660
TACTTCTACA	ACCCAGGTTG	AGGTAGGTCT	TGAAAGTCTA	GAGTTTATTA	TCGGTGAAGT	
GCATTGATGT	GCTAACCAGA	GCAGATGGGG	TGAAATATGC	AGATTTAGTC	TTAATGAGAG	720
CGTAACTACA	CGATTGGTCT	CGTCTACCCC	ACTTTATACG	TCTAAATCAG	AATTACTCTC	
AACTGGACAG	GGAAATCCAG	CCAACATACA	TAATGGAGCT	ACTAGCAATG	GATGGGGGTG	780
TTGACCTGTC	CCTTTAGGTC	GGTTGTATGT	ATTACCTCGA	TGATCGTTAC	CTACCCCCAC	
TACCATCACT	ATCTGGTACT	GCAGTGGTTA	ACATCCGAGT	CCTGGACTTT	AATGATAACA	840
ATGGTAGTGA	TAGACCATGA	CGTCACCAAT	TGTAGGCTCA	GGACCTGAAA	TTACTATTGT	
GCCCAGTGTT	TGAGAGAAGC	ACCATTGCTG	TGGACCTAGT	AGAGGATGCT	CCTCTGGGAT	900
CGGGTCACAA	ACTCTCTTCG	TGGTAACGAC	ACCTGGATCA	TCTCCTACGA	GGAGACCCTA	
ACCTTTTGT	GGAGTTACAT	GCTACTGACG	ATGATGAAGG	AGTGAATGGA	GAAATTGTTT	960
TGGAACAA	CCTCAATGTA	CGATGACTGC	TACTACTTCC	TCACTTACCT	CTTTAACAAA	
ATGGATTCA	CACTTTGGCA	TCTCAAGAGG	TACGTCAGCT	ATTTAAATTT	AACTCCAGAA	1020
TACCTAAGTC	GTGAAACCGT	AGAGTTCTCC	ATGCAGTCGA	TAAATTTTAA	TTGAGGTCTT	

CTGGCAGTGT	TACTCTTGAA	GGCCAAGTTG	ATTTTGAGAC	CAAGCAGACT	TACGAATTTG	1080
GACCGTCACA	ATGAGAACTT	CCGGTTCAAC	TAAAACTCTG	GTTCGTCTGA	ATGCTTAAAC	
AGGTACAAGC	CCAAGATTTG	GGCCCCAACC	CACTGACTGC	TACTTGTAAG	GTAAGTGTTT	1140
TCCATGTTTC	GGTTCTAAAC	CCGGGGTTGG	GTGACTGACG	ATGAACATTT	CATTGACAAG	
ATATACTTGA	TGTAAATGAT	AATACCCAG	CCATCACTAT	TACCCCTCTG	ACTACTGTAA	1200
TATATGAACT	ACATTTACTA	TTATGGGGTC	GGTAGTGATA	ATGGGGAGAC	TGATGACATT	
ATGCAGGAGT	TGCCTATATT	CCAGAAACAG	CCACAAAGGA	GAACCTTTATA	GCTCTGATCA	1260
TACGTCTCTA	ACGGATATAA	GGTCTTTGTC	GGTGTTCCT	CTTGAAATAT	CGAGACTAGT	
GCACTACTGA	CAGAGCCTCT	GGATCTAATG	GACAAGTTTC	CTGTACTCTT	TATGGACATG	1320
CGTGATGACT	GTCTCGGAGA	CCTAGATTAC	CTGTTCAAGC	GACATGAGAA	ATACCTGTAC	
AGCACTTTAA	ACTACAGCAA	GCTTATGAGG	ACAGTTACAT	GATAGTTACC	ACCTCTACTT	1380
TCGTGAAATT	TGATGTCGTT	CGAATACTCC	TGTCAATGTA	CTATCAATGG	TGGAGATGAA	
TAGACAGGGA	AAACATAGCA	GCGTACTCTT	TGACAGTAGT	TGCAGAAGAC	CTTGGCTTCC	1440
ATCTGTCCCT	TTTGTATCGT	CGCATGAGAA	ACTGTCATCA	ACGTCTTCTG	GAACCGAAGG	
CCTCATTGAA	GACCAAAAAG	TACTACACAG	TCAAGGTTAG	TGATGAGAAT	GACAATGCAC	1500
GGAGTAACTT	CTGGTTTTTC	ATGATGTGTC	AGTTCCAATC	ACTACTCTTA	CTGTTACGTG	
CTGTATTTTC	TAAACCCAG	TATGAAGCTT	CTATTCTGGA	AAATAATGCT	CCAGGCTCTT	1560
GACATAAAAG	ATTTGGGGTC	ATACTTCGAA	GATAAGACCT	TTTATTACGA	GGTCCGAGAA	
ATATAACTAC	AGTGATAGCC	AGAGACTCTG	ATAGTGATCA	AAATGGCAAA	GTAAATTACA	1620
TATATTGATG	TCACTATCGG	TCTCTGAGAC	TATCACTAGT	TTTACCGTTT	CATTTAATGT	
GACTTGTGGA	TGCAAAAGTG	ATGGGCCAGT	CACTAACAAC	ATTTGTTTCT	CTTGATGCGG	1680
CTGAACACCT	ACGTTTTTCAC	TACCCGGTCA	GTGATTGTTG	TAAACAAAGA	GAAGTACGCC	
ACTCTGGAGT	ATTGAGAGCT	GTTAGGTCTT	TAGACTATGA	AAACTTTAAA	CAACTGGATT	1740
TGAGACCTCA	TAAGTCTCGA	CAATCCAGAA	ATCTGATACT	TTTTGAATTT	GTTGACCTAA	
TTGAAATTGA	AGCTGCAGAC	AATGGGATCC	CTCAACTCTC	CACTCGCGTT	CAACTAAATC	1800
AACTTTAACT	TCGACGCTCTG	TTACCCTAGG	GAGTTGAGAG	GTGAGCGCAA	GTTGATTTAG	
TCAGAATAGT	TGATCAAAAT	GATAATTGCC	CTGTGATAAC	TAATCCTCTT	CTTAATAATG	1860
AGTCTTATCA	ACTAGTTTTA	CTATTAACGG	GACACTATTG	ATTAGGAGAA	GAATTATTAC	
GCTCGGGTGA	AGTTCTGCTT	CCCATCAGCG	CTCCTCAAAA	CTATTTAGTT	TTCCAGCTCA	1920
CGAGCCCACT	TCAAGACGAA	GGGTAGTCGC	GAGGAGTTTT	GATAAATCAA	AAGGTCGAGT	
AAGCCGAGGA	TTGAGATGAA	GGGCACAAC	CCCAGCTGTT	CTATACCATA	CTGAGAGATC	1980
TTGCGCTCCT	AAGTCTACTT	CCCGTGTTGA	GGGTCGACAA	GATATGGTAT	GAAGTCTTAG	
CAAGCAGATT	GTTTGCCATT	AACAAAGAAA	GTGGTGAAGT	GTTCTTGAAA	AAACAATTAA	2040
GTTGCTCTAA	CAACCGGTAA	TTGTTTCTTT	CACCACTTCA	CAAGGACTTT	TTTGTTAATT	
ACTCTGACCA	TTGAGAGGAC	TTGAGCATAG	TAGTTGCAGT	GTATGACTTG	GGAAGACCTT	2100
TGAGACTGGT	AAGTCTCCTG	AAGTCGTATC	ATCAACGTCA	CATACTGAAC	CCTTCTGGAA	
CATTATCCAC	CAATGCTACA	GTTAAATTCA	TCCTCACCAG	CTCTTTTCCT	TCTAACGTTG	2160
GTAATAGGTG	GTTACGATGT	CAATTTAAGT	AGGAGTGGCT	GAGAAAAGGA	AGATTGCAAC	

Fig. 6. (Continuation page 2, SEQ ID NO:6).

AAGTCGTTAT	TTTGCAACCA	TCTGCAGAAG	AGCAGCACCA	GATCGATATG	TCCATTATAT	2220
TTCAGCAATA	AAACGTTGGT	AGACGTCTTC	TCGTCTGGT	CTAGCTATAC	AGGTAATATA	
TCATTGCAGT	GCTGGCTGGT	GGTTGTGCTT	TGCTACTTTT	GGCCATCTTT	TTTGTGGCCT	2280
AGTAACGTCA	CGACCGACCA	CCAACACGAA	ACGATGAAAA	CCGGTAGAAA	AAACACCGGA	
GTACTIONTAA	AAAGAAAGCT	GGTGAATTTA	AGCAGGTACC	TGAACAACAC	GGAACATGCA	2340
CATGAACATT	TTTCTTTTGA	CCACTTAAAT	TCGTCCATGG	ACTTGTGTG	CCTGTACGT	
ATGAAGAACG	CCTGTTAAGC	ACCCCATCTC	CCCAGTCGGT	CTCTTCTTCT	TTGTCTCAGT	2400
TACTTCTTGC	GGACAATTCG	TGGGGTAGAG	GGGTCAGCCA	GAGAAGAAGA	AACAGAGTCA	
CTGAGTCATG	CCAACTCTCC	ATCAATACTG	AATCTGAGAA	TTGCAGCGTG	TCCTCTAACC	2460
GACTCAGTAC	GGTTGAGAGG	TAGTTATGAC	TTAGACTCTT	AACGTGCGAC	AGGAGATTGG	
AAGAGCAGCA	TCAGCAAACA	GGCATAAAGC	ACTCCATCTC	TGTACCATCT	TATCACACAT	2520
TTCTCGTCGT	AGTCGTTTGT	CCGTATTTTC	TGAGGTAGAG	ACATGGTAGA	ATAGTGTGTA	
CTGTTTGGCA	CCTGGACAAT	TGTGCAATGA	GCATAAGTGG	ACATTCTCAC	ATGGGGCACA	2580
GACCAACCGT	GGACCTGTTA	ACACGTTACT	CGTATTCACC	TGTAAGAGTG	TACCCCGTGT	
TTAGTACAAA	GGTACAGTGG	GCAAAGGAGA	TAGTGACTTC	AATGACAGTG	ACTCTGATAC	2640
AATCATGTTT	CCATGTCACC	CGTTTCCTCT	ATCACTGAAG	TTACTGTCAC	TGAGACTATG	
TAGTGAGAA	TCAGAAAAGA	AGAGCATTGA	GCAGCCAATG	CAGGCACAAG	CCAGTGCTCA	2700
ATCACCTCTT	AGTCTTTTCT	TCTCGTAACT	CGTCGGTTAC	GTCCGTGTTT	GGTCACGAGT	
ATACACAGAT	GAATCAGCAG	GGTTCCGACA	TGCCGATAAC	TATTTAGGCC	ACCGAATCAA	2760
TATGTGTCTA	CTTAGTCGTC	CCAAGGCTGT	ACGGCTATTG	ATAAAGTCGG	TGGCTTAGTT	
CAAGGGTCCA	GAAATGGGA	ACTGCACATT	GCAATATGAA	AAGGGCTATA	GACTGTCTTA	2820
GTTCCAGGT	CTTTTACCCT	TGACGTGTAA	CGTTATACTT	TTCCCGATAT	CTGACAGAAT	
CTCTGTAGCT	CCTGTATATT	ACAATACCTA	CCATGCAAGA	ATGCCTAACC	TGCACATACC	2880
GAGACATCGA	GGACATATAA	TGTTATGGAT	GGTACGTTCT	TACGGATTGG	ACGTGTATGG	
GAACCATACC	CTTAGAGACC	CTTATTACCA	TATCAATAAT	CCTGTTGCTA	ATCGGATGCA	2940
CTTGGTATGG	GAATCTCTGG	GAATAATGGT	ATAGTTATTA	GGACAACGAT	TAGCCTACGT	
GGCGGAATAT	GAAAGAGATT	TAGTCAACAG	AAGTGCAACG	TTATCTCCGC	AGAGATCGTC	3000
CCGCCTTATA	CTTTCTCTAA	ATCAGTTGTC	TTCACGTTGC	AATAGAGGCG	TCTCTAGCAG	
TAGCAGATAC	CAAGAATTCA	ATTACAGTCC	GCAGATATCA	AGACAGCTTC	ATCCTTCAGA	3060
ATCGTCTATG	GTTCTTAAGT	TAATGTCAGG	CGTCTATAGT	TCTGTGGAAG	TAGGAAGTCT	
AATTGCTACA	ACCTTTTAAAT	CATTAGGCAT	GCAAGTGAGA	ATGCACAAAG	GCAAGTGCTT	3120
TTAACGATGT	TGAAAAATTA	GTAATCCGTA	CGTTCACTCT	TACGTGTTTC	CGTTCACGAA	
TAGCATGAAA	GCTAAATATA	TGGAGTCTCC	CCTTTCCCTC	TGATGGATGG	GGGGAGACAC	3180
ATCGTACTTT	CGATTTATAT	ACCTCAGAGG	GGAAAGGGAG	ACTACCTACC	CCCCTCTGTG	
AGGACAGTGC	ATAAATATAC	AGCTGCTTTC	TATTTGCATT	TCACTTGGGA	ATTTTTTGTT	3240
TCCTGTCACG	TATTTATATG	TCGACGAAAG	ATAAACGTAA	AGTGAACCCT	TAAAAACAA	
TTTTTTACAT	ATTTATTTTT	CCTGAATTGA	ATGTGACATT	GTCCTGTCAC	CTAACTAGCA	3300
AAAAAATGTA	TAAATAAAAA	GGACTTAACT	TACACTGTAA	CAGGACAGTG	GATTGATCGT	

Fig. 6. (Continuation page 3, SEQ ID NO:6).

ATTAAATCCA	CAGACCTACA	GTCAAATATT	TGAGGGCCCC	TGAAACAGCA	CATCAGTCAG	3360
TAATTTAGGT	GTCTGGATGT	CAGTTTATAA	ACTCCCGGGG	ACTTTGTCGT	GTAGTCAGTC	
GACCTAAAGT	GGCCTTTTTA	CTTTTAGCAG	CTCCTGGGTC	TGCCCTCTGT	GTTAATCAGC	3420
CTGGATTTC	CCGGAAAAAT	GAAAATCGTC	GAGGACCCAG	ACGGGAGACA	CAATTAGTCG	
CCCTGGTCAA	GTCCTGAGTA	GGATCATGGC	GTTTTTATAT	GCATCTCACC	TACTTTGGAC	3480
GGGACCAAGT	CAGGACTCAT	CCTAGTACCG	CAAAAATATA	CGTAGAGTGG	ATGAAACCTG	
GTGATTTACA	CATAATAGGA	AACGCTTGGT	TTCAGTGAAG	TCTGTGTTGT	ATATATTCTG	3540
CACTAAATGT	GTATTATCCT	TTGCGAACCA	AAGTCACTTC	AGACACAACA	TATATAAGAC	
TTATATACAC	GCATTTTGTG	TTTGTGTATA	TATTTCAAGT	CCATTCAGAT	ATGTGTATAT	3600
AATATATGTG	CGTAAACAC	AAACACATAT	ATAAAGTTCA	GGTAAGTCTA	TACACATATA	
AGTGCAGACC	TTGTAAATTA	AATATTCTGA	TACTTTTTCC	TCAATAAATA	TTTAAAT	
TCACGTCTGG	AACATTTAAT	TTATAAGACT	ATGAAAAAGG	AGTTATTTAT	AAATTTA	

Fig. 6. (Continuation page 4, SEQ ID NO:6).

MVCCGPGRML LGWAGLLVLA ALCLLQVPGA QAAACEPVRI PLCKSLPWNM TKMPNHLHHS 60
TQANAILAME QFEGLLGTHC SPDLLFFLCA MYAPICTIDF QHEPIKPCKS VCERARQGCE 120
PILIKYRHSW PESLACDELP VYDRGVCISP EAIVTADGAD FPMDSSTGHC RGASSERCKC 180
KPV RATQKTY FRNNYNYVIR AKVKEVKMKC HDVTAVVEVK EILKASLVNI PRDTVNLVTT 240
SGCLCPPLTV NEEYVIMGYE DEERSRLLLV EGSIAEKWKD RLGKKVKRWD MKLRHLGLGK 300
TDASDSTQNQ KSGRNSNPRP ARS.

Figure 7. Deduced amino acid sequence of mouse FRZB-1 protein. SEQ ID NO:7.

Figure 8. Nucleotide sequence of the full-length mouse FRZB-1 cDNA. SEQ ID NO:8.

AAGCCTGGGA	CCATGGTCTG	CTGCGGCCCCG	GGACGGATGC	TGCTAGGATG	GGCCGGGTTG	60
TTCGGACCCT	GGTACCAGAC	GACGCCGGGC	CCTGCCTACG	ACGATCCTAC	CCGGCCCAAC	
CTAGTCCTGG	CTGCTCTCTG	CCTGCTCCAG	GTGCCCCGAG	CTCAGGCTGC	AGCCTGTGAG	120
GATCAGGACC	GACGAGAGAC	GGACGAGGTC	CACGGGCCTC	GAGTCCGACG	TCGGACACTC	
CCTGTCCGCA	TCCCCTGTG	CAAGTCCCTT	CCCTGGAACA	TGACCAAGAT	GCCCAACCAC	180
GGACAGGCGT	AGGGCGACAC	GTTCAGGGAA	GGGACCTTGT	ACTGGTTCTA	CGGGTTGGTG	
CTGCACCACA	GCACCCAGGC	TAACGCCATC	CTGGCCATGG	AACAGTTCGA	AGGGCTGCTG	240
GACGTGGTGT	CGTGGGTCCG	ATTGCGGTAG	GACCGGTACC	TTGTCAAGCT	TCCCACGAC	
GGCACCCT	GCAGCCCGGA	TCTTCTCTTC	TTCCTCTGTG	CAATGTACGC	ACCCATTTGC	300
CCGTGGGTGA	CGTCGGGCCT	AGAAGAGAAG	AAGGAGACAC	GTTACATGCG	TGGGTAAACG	
ACCATCGACT	TCCAGCACGA	GCCCATCAAG	CCCTGCAAGT	CTGTGTGTGA	GCGCGCCCGA	360
TGGTAGCTGA	AGGTCGTGCT	CGGGTAGTTC	GGGACGTTCA	GACACACACT	CGCGCGGGCT	
CAGGGCTGCG	AGCCCATTTCT	CATCAAGTAC	CGCCACTCGT	GGCCGGAAAAG	CTTGGCCTGC	420
GTCCCACGCG	TCGGGTAAGA	GTAGTTTCATG	GCGGTGAGCA	CCGGCCTTTC	GAACCGGACG	
GACGAGCTGC	CGGTGTACGA	CCGCGGCGTG	TGCATCTCTC	CTGAGGCCAT	CGTCACCGCG	480
CTGCTCGACG	GCCACATGCT	GGCGCCGCAC	ACGTAGAGAG	GACTCCGGTA	GCACTGGCGC	
GACGGAGCGG	ATTTTCCTAT	GGATTCAAGT	ACTGGACACT	GCAGAGGGGC	AAGCAGCGAA	540
CTGCCTCGCC	TAAAAGGATA	CCTAAGTTCA	TGACCTGTGA	CGTCTCCCCG	TCGTCTCGTT	
CGTTGCAAAT	GTAAGCCTGT	CAGAGCTACA	CAGAAGACCT	ATTTCCGGAA	CAATTACAAC	600
GCAACGTTTA	CATTCCGACA	GTCTCGATGT	GTCTTCTGGA	TAAAGGCCTT	GTTAATGTTG	
TATGTCATCC	GGGCTAAAAGT	TAAAGAGGTA	AAGATGAAAT	GTCATGATGT	GACCGCCGTT	660
ATACAGTAGG	CCCGATTTC	ATTTCTCCAT	TTCTACTTTA	CAGTACTACA	CTGGCGGCAA	
GTGGAAGTGA	AGGAAATTCT	AAAGGCATCA	CTGGTAAACA	TTCCAAGGGA	CACCGTCAAT	720
CACCTTCACT	TCCTTTAAGA	TTTCCGTAGT	GACCATTTGT	AAGGTTCCCT	GTGGCAGTTA	
CTTTATACCA	CCTCTGGCTG	CCTCTGTCCT	CCACTTACTG	TCAATGAGGA	ATATGTCATC	780
GAAATATGGT	GGAGACCGAC	GGAGACAGGA	GGTGAATGAC	AGTTACTCCT	TATACAGTAG	
ATGGGCTATG	AAGACGAGGA	ACGTTCCAGG	TTACTCTTGG	TAGAAGGCTC	TATAGCTGAG	840
TACCCGATAC	TTCTGCTCCT	TGCAAGGTCC	AATGAGAACC	ATCTTCCGAG	ATATCGACTC	
AAGTGGAAGG	ATCGGCTTGG	TAAGAAAGTC	AAGCGCTGGG	ATATGAAACT	CCGACACCTT	900
TTACCTTCC	TAGCCGAACC	ATTCTTTTCA	TTGCGGACCC	TATACTTTGA	GGCTGTGGAA	
GGACTGGGTA	AACTGATGC	TAGCGATTCC	ACTCAGAATC	AGAAGTCTGG	CAGGAACTCT	960
CCTGACCCAT	TTTGACTACG	ATCGCTAAGG	TGAGTCTTAG	TCTTCAGACC	GTCTTGAGA	

AATCCCCGGC	CAGCACGCAG	CTAAATCCTG	AAATGTAAAA	GGCCACACCC	ACGGACTCCC	1020
TTAGGGGGCCG	GTCGTGCGTC	GATTTAGGAC	TTTACATTTT	CCGGTGTGGG	TGCCTGAGGG	
TTCTAAGACT	GGCGCTGGTG	GACTAACAAA	GGAAAACCGC	ACAGTTGTGC	TCGTGACCGA	1080
AAGATTCTGA	CCGCGACCAC	CTGATTGTTT	CCTTTTGGCG	TGTCAACACG	AGCACTGGCT	
TTGTTTACCG	CAGACACCGC	GTGGCTACCG	AAGTTACTTC	CGGTCCCCTT	TCTCCTGCTT	1140
AACAAATGGC	GTCTGTGGCG	CACCGATGGC	TTCAATGAAG	GCCAGGGGAA	AGAGGACGAA	
CTTAATGGCG	TGGGGTTAGA	TCCTTTAATA	TGTTATATAT	TCTGTTTCAT	CAATCACGTG	1200
GAATTACCGC	ACCCCAATCT	AGGAAATTAT	ACAATATATA	AGACAAAGTA	GTTAGTGCAC	
GGGACTGTTC	TTTTGCAACC	AGAATAGTAA	ATTAAATATG	TTGATGCTAA	GGTTTCTGTA	1260
CCCTGACAAG	AAAACGTTGG	TCTTATCATT	TAATTTATAC	AACTACGATT	CCAAAGACAT	
CTGGACTCCC	TGGGTTTAAT	TTGGTGTTC	GTACCCTGAT	TGAGAATGCA	ATGTTTCATG	1320
GACCTGAGGG	ACCCAAATTA	AACCACAAGA	CATGGGACTA	ACTCTTACGT	TACAAAGTAC	
TAAAGAGAGA	ATCCTGGTCA	TATCTCAAGA	ACTAGATATT	GCTGTAAGAC	AGCCTCTGCT	1380
ATTTCTCTCT	TAGGACCAGT	ATAGAGTTCT	TGATCTATAA	CGACATTCTG	TCGGAGACGA	
GCTGCGCTTA	TAGTCTTG TG	TTTGTATGCC	TTTGTCCATT	TCCCTCATGC	TGTGAAAAGTT	1440
CGACGCGAAT	ATCAGAACAC	AAACATACGG	AAACAGGTAA	AGGGAGTACG	ACACTTTCAA	
ATACATGTTT	ATAAAGGTAG	AACGGCATT	TGAAATCAGA	CACTGCACAA	GCAGAGTAGC	1500
TATGTACAAA	TATTTCCATC	TTGCCGTAAA	ACTTTAGTCT	GTGACGTGTT	CGTCTCATCG	
CCAACACCAG	GAAGCATTTA	TGAGGAAACG	CCACACAGCA	TGACTTATTT	TCAAGATTGG	1560
GGTTGTGGTC	CTTCGTAAAT	ACTCCTTTGC	GGTGTGTCGT	ACTGAATAAA	AGTTCTAACC	
CAGGCAGCAA	AATAAATAGT	GTTGGGAGCC	AAGAAAAGAA	TATTTTGCCT	GGTTAAGGGG	1620
GTCCGTCGTT	TTATTTATCA	CAACCCTCGG	TTCTTTTCTT	ATAAAACGGA	CCAATTCCCC	
CACACTGGAA	TCAGTAGCCC	TTGAGCCATT	AACAGCAGTG	TTCTTCTGGC	AAGTTTTTGA	1680
GTGTGACCTT	AGTCATCGGG	AACTCGGTAA	TTGTGCTCAC	AAGAAGACCG	TTCAAAAAC	
TTTGTTTATA	AATGTATTCA	CGAGCATTAG	AGATGAACTT	ATAACTAGAC	ATCTGTTGTT	1740
AAACAAGTAT	TTACATAAGT	GCTCGTAATC	TCTACTTGAA	TATTGATCTG	TAGACAACAA	
ATCTCTATAG	CTCTGCTTCC	TTCTAAATCA	AACCCATTGT	TGGATGCTCC	CTCTCCATTC	1800
TAGAGATATC	GAGACGAAGG	AAGATTTAGT	TTGGGTAAAC	ACCTACGAGG	GAGAGGTAAG	

ATAAATAAAT	TTGGCTTGCT	GTATTGGCCA	GGAAAAGAAA	GTATTAAAGT	ATGCATGCAT	1860
TATTTATTTA	AACCGAACGA	CATAACCGGT	CCTTTTCTTT	CATAATTTCA	TACGTACGTA	
GTGCACCAGG	GTGTTATTTA	ACAGAGGTAT	GTAACCTCTAT	AAAAGACTAT	AATTTACAGG	1920
CACGTGGTCC	CACAATAAAT	TGTCTCCATA	CATTGAGATA	TTTTCTGATA	TTAAATGTCC	
ACACGGAAAT	GTGCACATTT	GTTTACTTTT	TTTCTTCCTT	TTGCTTTGGG	CTTGTGATTT	1980
TGTGCCTTTA	CACGTGTAAA	CAAATGAAAA	AAAGAAGGAA	AACGAAACCC	GAACACTAAA	
TGGTTTTTGG	TGTGTTTATG	TCTGTATTTT	GGGGGGTGGG	TAGGTTTAAG	CCATTGCACA	2040
ACCAAAAACC	ACACAAATAC	AGACATAAAA	CCCCCACC	ATCCAAATTC	GGTAACGTGT	
TTCAAGTTGA	ACTAGATTAG	AGTAGACTAG	GCTCATTGGC	CTAGACATTA	TGATTTGAAT	2100
AAGTTCAACT	TGATCTAATC	TCATCTGATC	CGAGTAACCG	GATCTGTAAT	ACTAAACTTA	
TTGTGTTGTT	TAATGCTCCA	TCAAGATGTC	TAATAAAAGG	AATATGGTTG	TCAACAGAGA	2160
AACACAACAA	ATTACGAGGT	AGTTCTACAG	ATTATTTTCC	TTATACCAAC	AGTTGTCTCT	
CGACAACAAC	AACAAA					
GCTGTTGTTG	TTGTTT					

MVCGSPGGML LLRAGLLALA ALCLLRVPGA RAAACEPVRI PLCKSLPWNM TKMPNHLHHS 60
TQANAILAIE QFEGLLGTHC SPDLLFFLCA MYAPICTIDF QHEPIKPCKS VCERARQGCE 120
PILIKYRHSW PENLACEELP VYDRGVCISP EAIVTADGAD FPMDSNGNC RGASSERCKC 180
KPIRATQKTY FRNNYNYVIR AKVKEIKTKC HDVTAVVEVK EILKSSLVNI PRDTVNLYTS 240
SGCLCPPLNV NEEYIIMGYE DEERSRLLLV EGSIAEKWKD RLGKKVKRWD MKLRHLGLSK 300
SDSSNSDSTQ SQKSGRNSNP RQARN.

Figure 9. Deduced amino acid sequence of human FRZB-1 protein. SEQ ID NO:9.

Figure 10. Nucleotide sequence of the full-length human FRZB-1 cDNA. SEQ ID NO:10.
This sequence was assembled from public ESTs from the Genbank database
(accession numbers: H18848, R63748, W38677, W44760, H38379 and N71244).

GGCGGAGCGG	GCCTTTTGGC	GTCCACTGCG	CGGCTGCACC	CTGCCCCATC	TGCCGGGATC	60
CCGCCTCGCC	CGGAAAACCG	CAGGTGACGC	GCCGACGTGG	GACGGGGTAG	ACGGCCCTAG	
ATGGTCTGCG	GCAGCCCGGG	AGGGATGCTG	CTGCTGCGGG	CCGGGCTGCT	TGCCCTGGCT	120
TACCAGACGC	CGTCGGGCCC	TCCCTACGAC	GACGACGCCC	GGCCCACGA	ACGGGACCGA	
GCTCTCTGCC	TGCTCCGGGT	GCCCCGGGCT	CGGGCTGCAG	CCTGTGAGCC	CGTCCGCATC	180
CGAGAGACGG	ACGAGGCCCA	CGGGCCCCGA	GCCCCACGTC	GGAACTCTCG	GCAGGCGTAG	
CCCCGTGTGA	AGTCCCTGCC	CTGGAACATG	ACTAAGATGC	CCAACCACCT	GCACCACAGC	240
GGGGACACGT	TCAGGGACGG	GACCTTGTA	TGATTCTACG	GGTTGGTGGA	CGTGGTGTCG	
ACTCAGGCCA	ACGCCATCCT	GGCCATCGAG	CAGTTCGAAG	GTCTGCTGGG	CACCCACTGC	300
TGAGTCCGGT	TGCGGTAGGA	CCGGTAGCTC	GTCAAGCTTC	CAGACGACCC	GTGGGTGACG	
AGCCCCGATC	TGCTCTTCTT	CCTCTGTGCC	ATGTACGCGC	CCATCTGCAC	CATTGACTTC	360
TCGGGGCTAG	ACGAGAAGAA	GGAGACACGG	TACATGCGCG	GGTAGACGTG	GTAAGTGAAG	
CAGCAGGAGC	CCATCAAGCC	CTGTAAGTCT	GTGTGCGAGC	GGGCCCCGCA	GGGCTGTGAG	420
GTCGTGCTCG	GGTAGTTCGG	GACATTGACA	CACACGCTCG	CCCGGGCCGT	CCCGACACTC	
CCCATACTCA	TCAAGTACCG	CCACTCGTGG	CCGGAGAACC	TGGCCTGCGA	GGAGCTGCCA	480
GGGTATGAGT	AGTTCATGGC	GGTGAGCACC	GGCCTCTTGG	ACCGGACGCT	CCTCGACGGT	
GTGTACGACA	GGGGCGTGTG	CATCTCTCCC	GAGGCCATCG	TACTGCGGGA	CGGAGCTGAT	540
CACATGCTGT	CCCCGCACAC	GTAGAGAGGG	CTCCGGTAGC	AATGACGCCT	GCCTCGACTA	
TTTCCTATGG	ATTCTAGTAA	CGGAAACTGT	AGAGGGGCAA	GCAGTGAACG	CTGTAAATGT	600
AAAGGATACC	TAAGATCATT	GCCTTTGACA	TCTCCCCGTT	CGTCACTTGC	GACATTTACA	
AAGCCTATTA	GAGCTACACA	GAAGACCTAT	TTCCGGAACA	ATTACAACTA	TGTCATTTCGG	660
TTCGGATAAT	CTCGATGTGT	CTTCTGGATA	AAGGCCTTGT	TAATGTTGAT	ACAGTAAGCC	
GCTAAAGTTA	AAGAGATAAA	GACTAAGTGC	CATGATGTGA	CTGCAGTAGT	GGAGGTGAAG	720
CGATTTCAAT	TTCTCTATTT	CTGATTACAG	GTAATACTAC	GACGTCATCA	CCTCCACTTC	
GAGATTCTAA	AGTCCTCTCT	GGTAAACATT	CCACGGGACA	CTGTCAACCT	CTATACCAGC	780
CTCTAAGATT	TCAGGAGAGA	CCATTTGTAA	GGTGCCCTGT	GACAGTTGGA	GATATGGTGC	
TCTGGCTGCC	TCTGCCCTCC	ACTTAATGTT	AATGAGGAAT	ATATCATCAT	GGGCTATGAA	840
AGACCGACGG	AGACGGGAGG	TGAATTACAA	TTACTCCTTA	TATAGTAGTA	CCCATACTT	

GATGAGGAAC	GTTCCAGATT	ACTCTTGGTG	GAAGGCTCTA	TAGCTGAGAA	GTGGAAGGAT	900
CTACTCCTTG	CAAGGTCTAA	TGAGAACCAC	CTTCCGAGAT	ATCGACTCTT	CACCTTCCTA	
CGACTCGGTA	AAAAAGTTAA	GCGCTGGGAT	ATGAAGCTTC	GTCATCTTGG	ACTCAGTAAA	960
GCTGAGCCAT	TTTTTCAATT	CGCGACCCTA	TACTTCGAAG	CAGTAGAACC	TGAGTCATTT	
AGTGATTCTA	GCAATAGTGA	TTCCACTCAG	AGTCAGAAGT	CTGGCAGGAA	CTCGAACCCC	1020
TCTACTAAGAT	CGTTATCACT	AAGGTGAGTC	TCAGTCTTCA	GACCGTCCTT	GAGCTTGGGG	
CGGCAAGCAC	GCAACTAAAT	CCCGAAATAC	AAAAAGTAAC	ACAGTGGACT	TCCTATTAAG	1080
GCCGTTTCGTG	CGTTGATTTA	GGGCTTTATG	TTTTTCATTG	TGTCACCTGA	AGGATAATTC	
ACTTACTTGC	ATTGCTGGAC	TAGCAAAGGA	AAATTGCACT	ATTGCACATC	ATATTCTATT	1140
TGAATGAACG	TAACGACCTG	ATCGTTTCCT	TTTAACGTGA	TAACGTGTAG	TATAAGATAA	
GTTTACTATA	AAAATCATGT	GATAACTGAT	TATTACTTCT	GTTTCTCTTT	TGGTTTCTGC	1200
CAAATGATAT	TTTAGTACA	CTATTGACTA	ATAATGAAGA	CAAAGAGAAA	ACCAAAGACG	
TTCTCTCTTC	TCTCAACCCC	TTTGTAAATGG	TTTGGGGGCA	GACTCTTAAG	TATATTGTGA	1260
AAGAGAGAAG	AGAGTTGGGG	AAACATTACC	AAACCCCGCT	CTGAGAATTC	ATATAACACT	
GTTTTCTATT	TCTACTAATCA	TGAGAAAAAC	TGTTCTTTTG	CAATAATAAT	AAATTAAACA	1320
CAAAAGATAA	AGTGATTAGT	ACTCTTTTTG	ACAAGAAAAC	GTTATTATTA	TTTAATTTGT	
TGCTGTTACC	AGAGCCTCTT	TGCTGAGTCT	CCAGATGTTA	ATTTACTTTC	TGCACCCCAA	1380
ACGACAATGG	TCTCGGAGAA	ACGACTCAGA	GGTCTACAAT	TAAATGAAAG	ACGTGGGGTT	
TTGGGAATGC	AATATTGGAT	GAAAAGAGAG	GTTTCTGGTA	TTCACAGAAA	GCTAGATATG	1440
AACCCTTACG	TTATAACCTA	CTTTTCTCTC	CAAAGACCAT	AAGTGTCTTT	CGATCTATAC	
CCTTAAACA	TACTCTGCCG	ATCTAATTAC	AGCCTTATTT	TTGTATGCCT	TTTGGGCATT	1500
GGAATTTTGT	ATGAGACGGC	TAGATTAATG	TCGGAATAAA	AACATACGGA	AAACCCGTAA	
CTCCTCATGC	TTAGAAAGTT	CCAAATGTTT	ATAAAGGTAA	AATGGCAGTT	TGAAGTCAAA	1560
GAGGAGTACG	AATCTTTCAA	GGTTTACAAA	TATTTCCATT	TTACCGTCAA	ACTTCAGTTT	
TGTCACATAG	GCAAAGCAAT	CAAGCACCAG	GAAGTGTTTA	TGAGGAAACA	ACACCCAAGA	1620
ACAGTGATC	CGTTTCGTTA	GTTTCGTGGT	CTTCACAAAT	ACTCCTTTGT	TGTGGGTTCT	
TGAATTATTT	TTGAGACTGT	CAGGAAGTAA	AATAAATAGG	AGCTTAAGAA	AGAACATTTT	1680
ACTTAATAAA	AACTCTGACA	GTCTTCATT	TTATTTATCC	TCGAATTCCT	TCTTGTAATA	
GCCTGATTGA	GAAGCACAAAC	TGAAACCACT	AGCCGCTGGG	GTGTTAATGG	TAGCATTCTT	1740
CGGACTAACT	CTTCGTGTTG	ACTTTGGTCA	TCGGCGACCC	CACAATTACC	ATCGTAAGAA	
CTTTTGGCAA	TACATTTGAT	TTGTTTCATGA	ATATATTAAT	CAGCATTAGA	GAAATGAATT	1800
GAAAACCGTT	ATGTAAACTA	AACAAGTACT	TATATAATTA	GTCGTAATCT	CTTTACTTAA	
ATAACTAGAC	ATCTGCTGTT	ATCACCATAG	TTTTGTTTAA	TTTGCTTCCT	TTTAAATAAA	1860
TATTGATCTG	TAGACGACAA	TAGTGGTATC	AAAACAAATT	AAACGAAGGA	AAATTTATTT	
CCCATTTGGTG	AAAGTCAAAA	AAAAAAAAAA	AAA			
GGGTAACCAC	TTTCAGTTTT	TTTTTTTTTT	TTT			